Review of EU airport energy interests and priorities with respect to: ICT, energy efficiency and enhanced building operation

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Overview

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2. AIRPORT overview
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CASCADE: ICT for Energy Efficient Airports

CASCADE
ICT for Energy Efficient Airports

SEVENTH FRAMEWORK PROGRAMME

- CASCADE will develop facility-specific measurement-based **energy action plan for airport energy managers** underpinned by systematic **Fault Detection Diagnosis (FDD)** Methods.
- CASCADE will develop a framework and methodology to underpin the execution of customised ICT solutions building **upon existing ICT infrastructure**. >>> LEGACY SYSTEMS
- CASCADE will enable transformation of FDD into actionable information by developing an energy action plan that links **Actions-Actors-ISO50001** Standards through a **web-based management portal**.

WP1: Operation scenarios of the European airports and other like facilities >>> **survey**

PROJECT PARTNERS

Aeroporti di Roma · Fraunhofer ISE · iMP projects in solar energy · D'APPOLONIA · SENSUS Machine Intelligence · SEA Milano Malpensa · NUI Galway OÉ Gaillimh · PSE · enerit energy action every day

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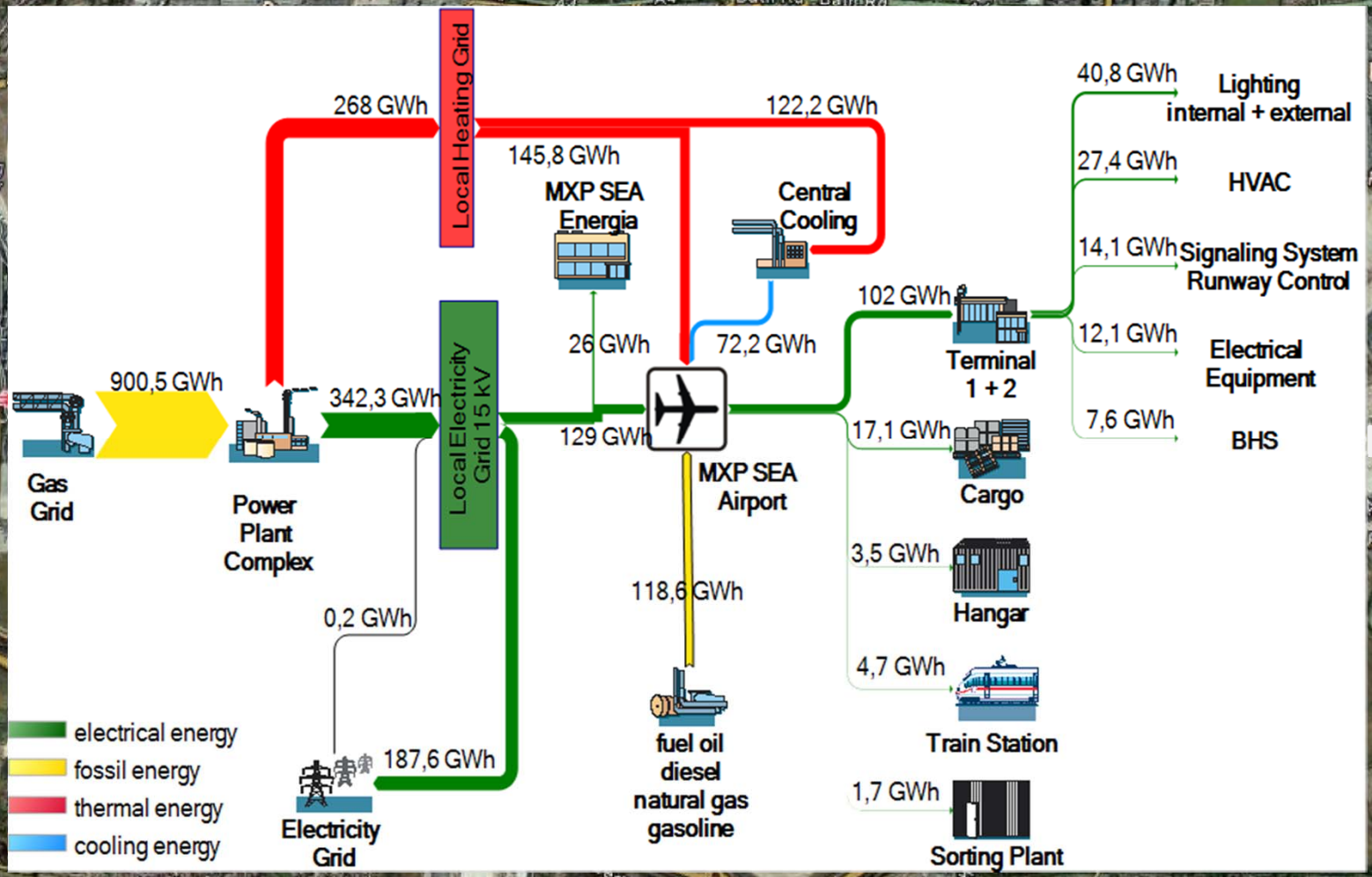
Airports

EU Airports: 1.5 Billion Passenger / Year



Source: ACI-Europe. 2012. ACI-Europe Statistics. [Online]. Available from: http://www.aci-europe.org
images https://maps.google.es/

EU Airports: Sample

ACI EUROPE
AIRPORTS COUNCIL INTERNATIONAL

93 busiest Airports 2010 by PAX

+

airport carbon accreditation

57 ACA Accredited Airports

=

Final SAMPLE 113 airports

ENERGY CONSUMPTION

ACTIONS

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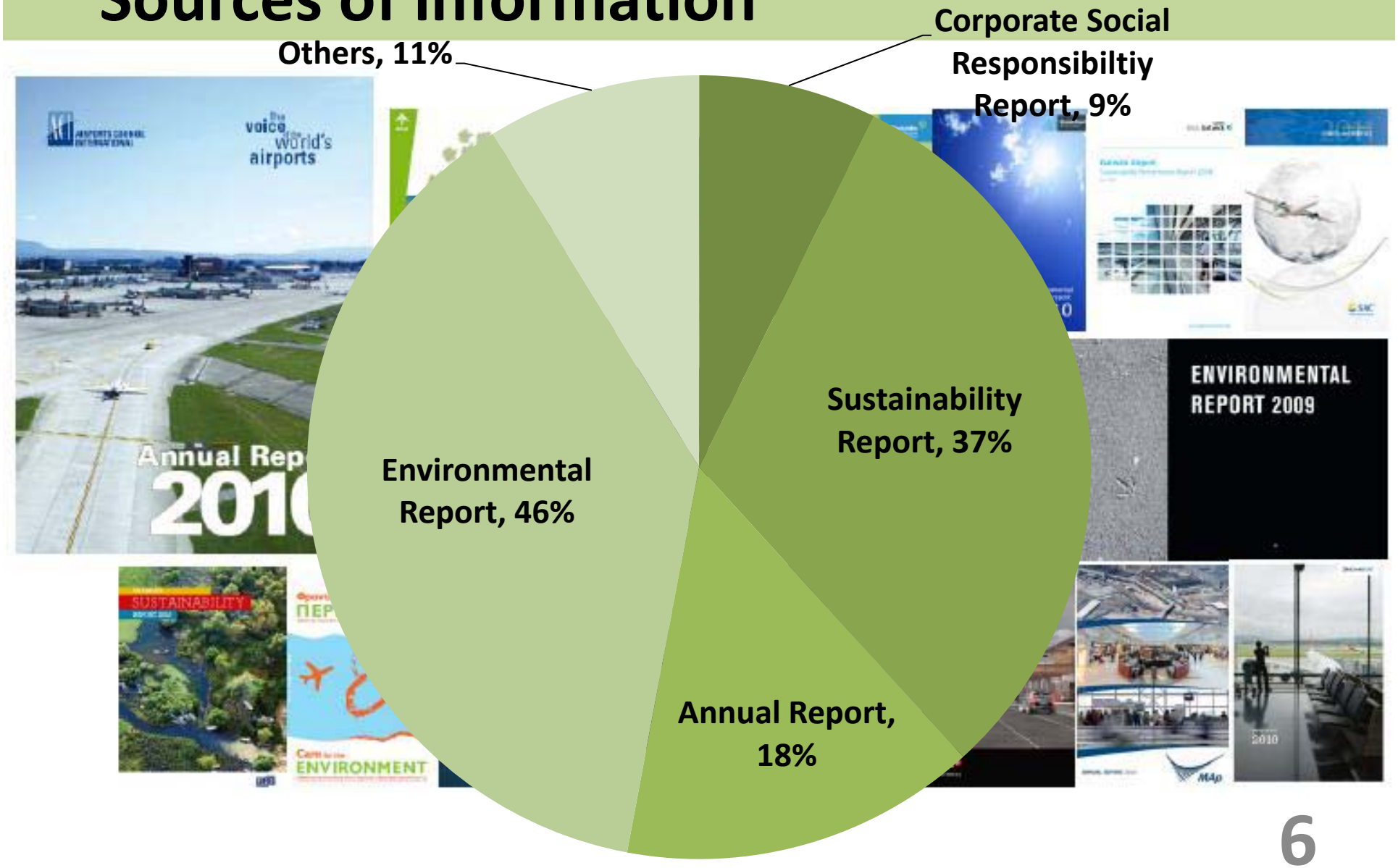
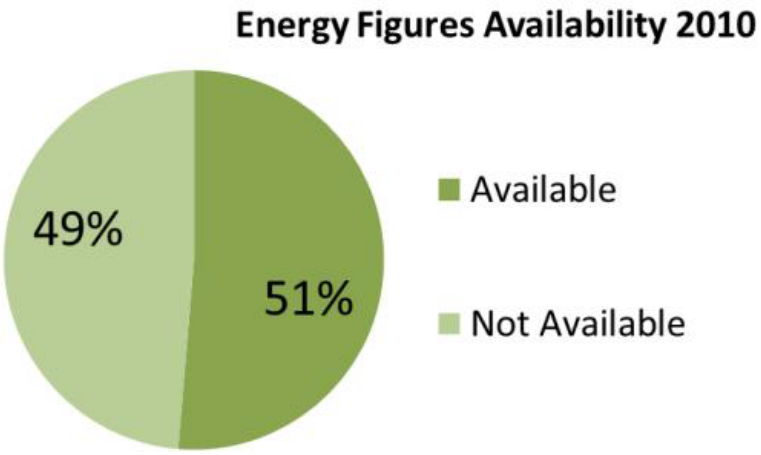
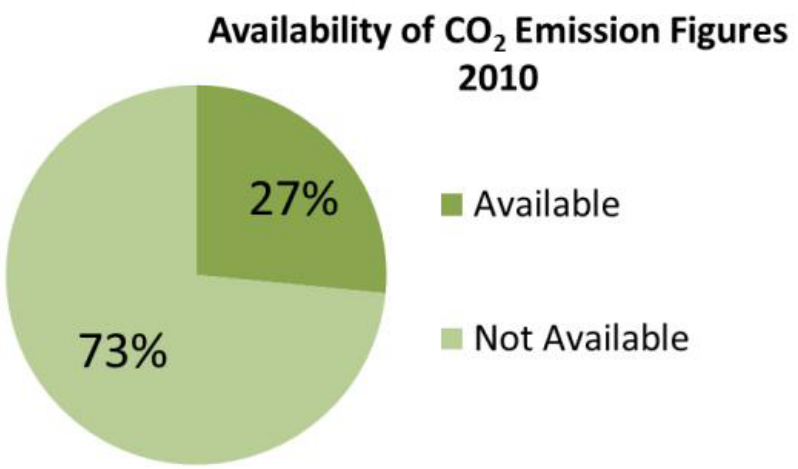
Sources of information



FIGURES Availability





- **Cluster of airports: Aggregated figures**
- **Small airports benefit from general policies at large organisations**

EU Airport Survey: ISSUES

Carbon emissions by Scope

Source: http://www.ghgprotocol.org/

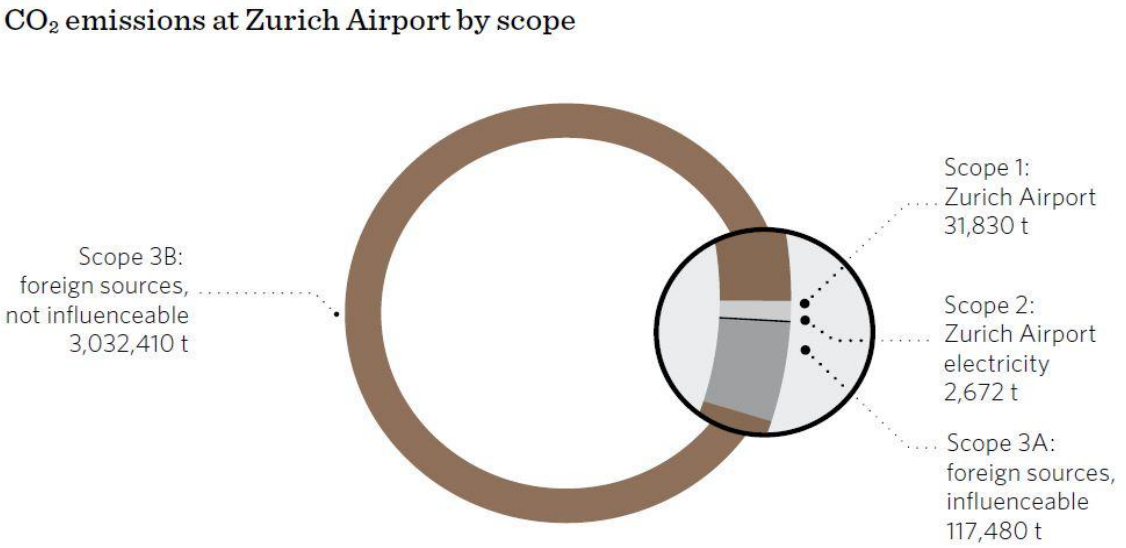
Scope 1: All direct GHG emissions.

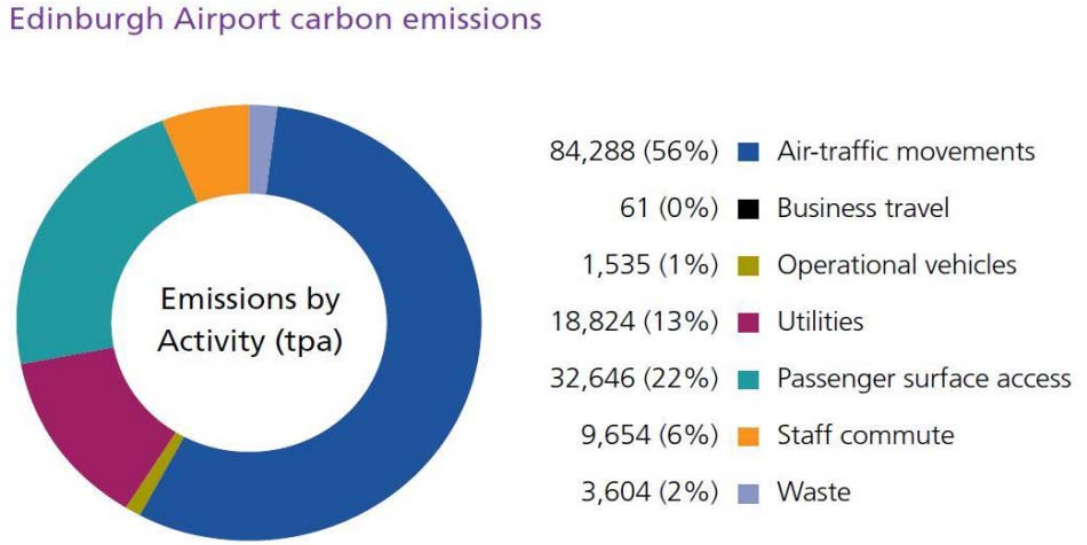
Scope 2: Indirect GHG emissions from consumption of purchased electricity, heat or steam.

Scope 3: Other indirect emissions. (…)

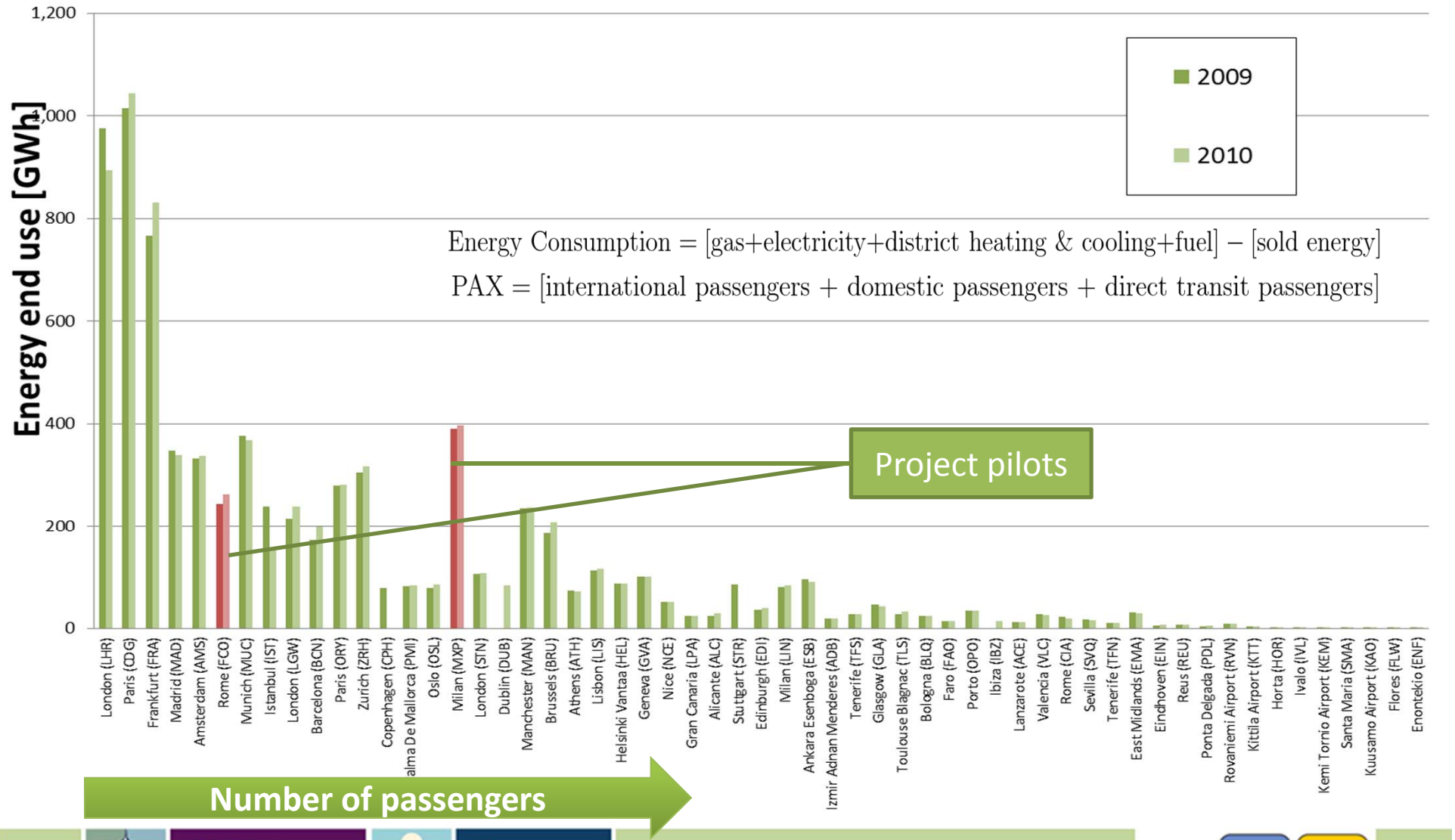
Transport coming from/to airport? Aircraft main engines in the LTO cycle? Aircraft emissions during cruise on flights to or from airport?

Carbon emissions by Activity





Energy Figures. Absolute Energy Use



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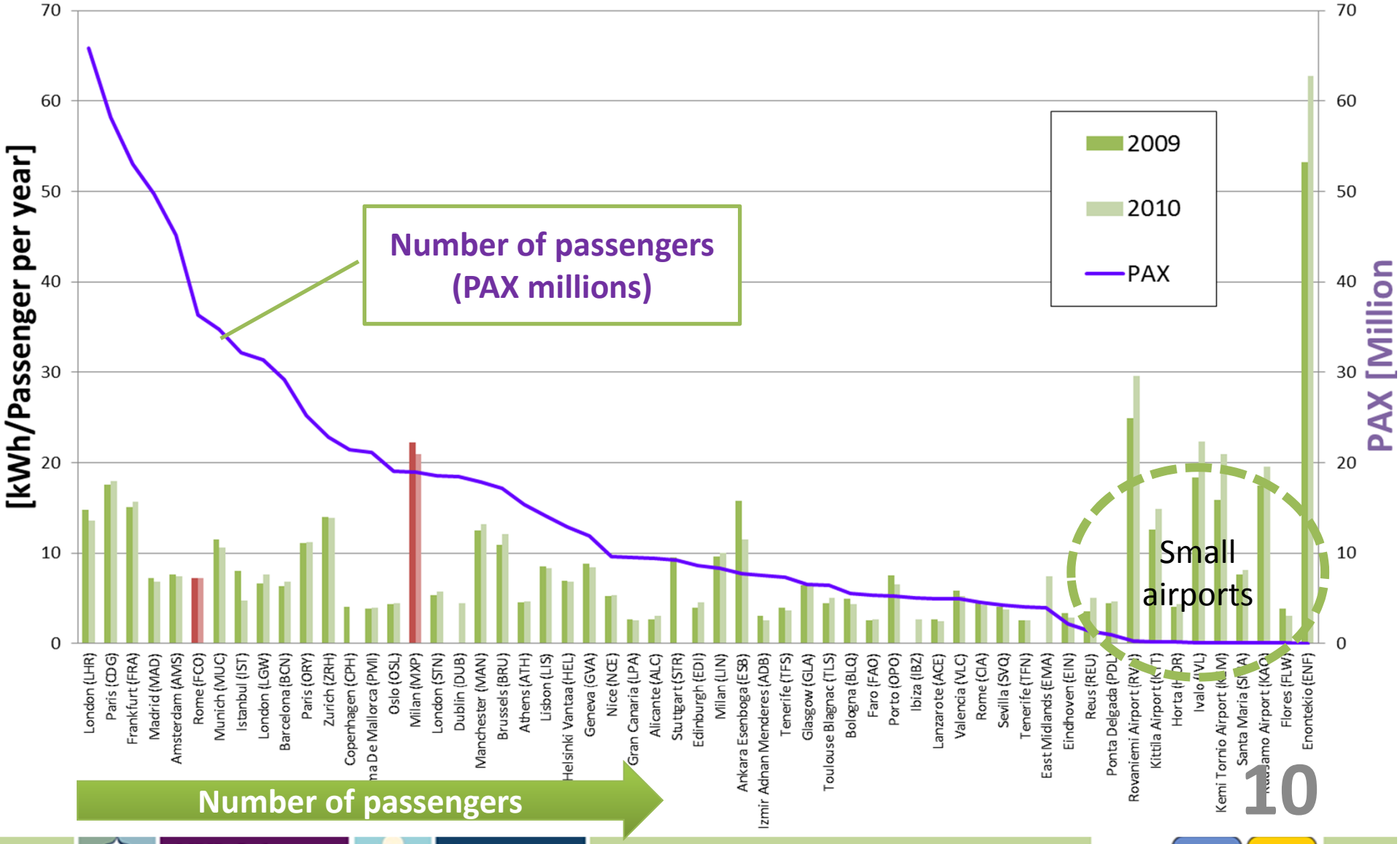
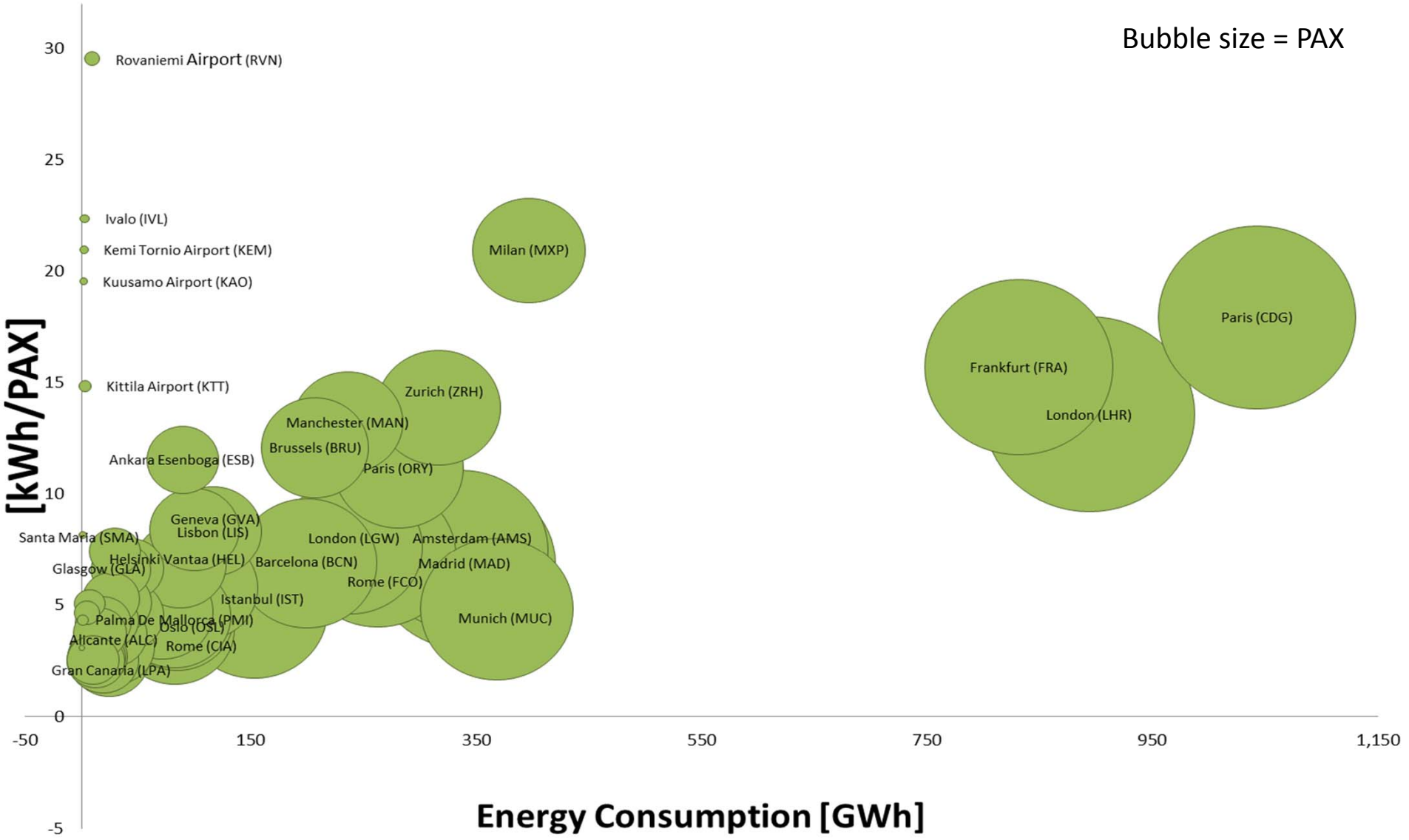
Energy Figures 2: Normalised Energy

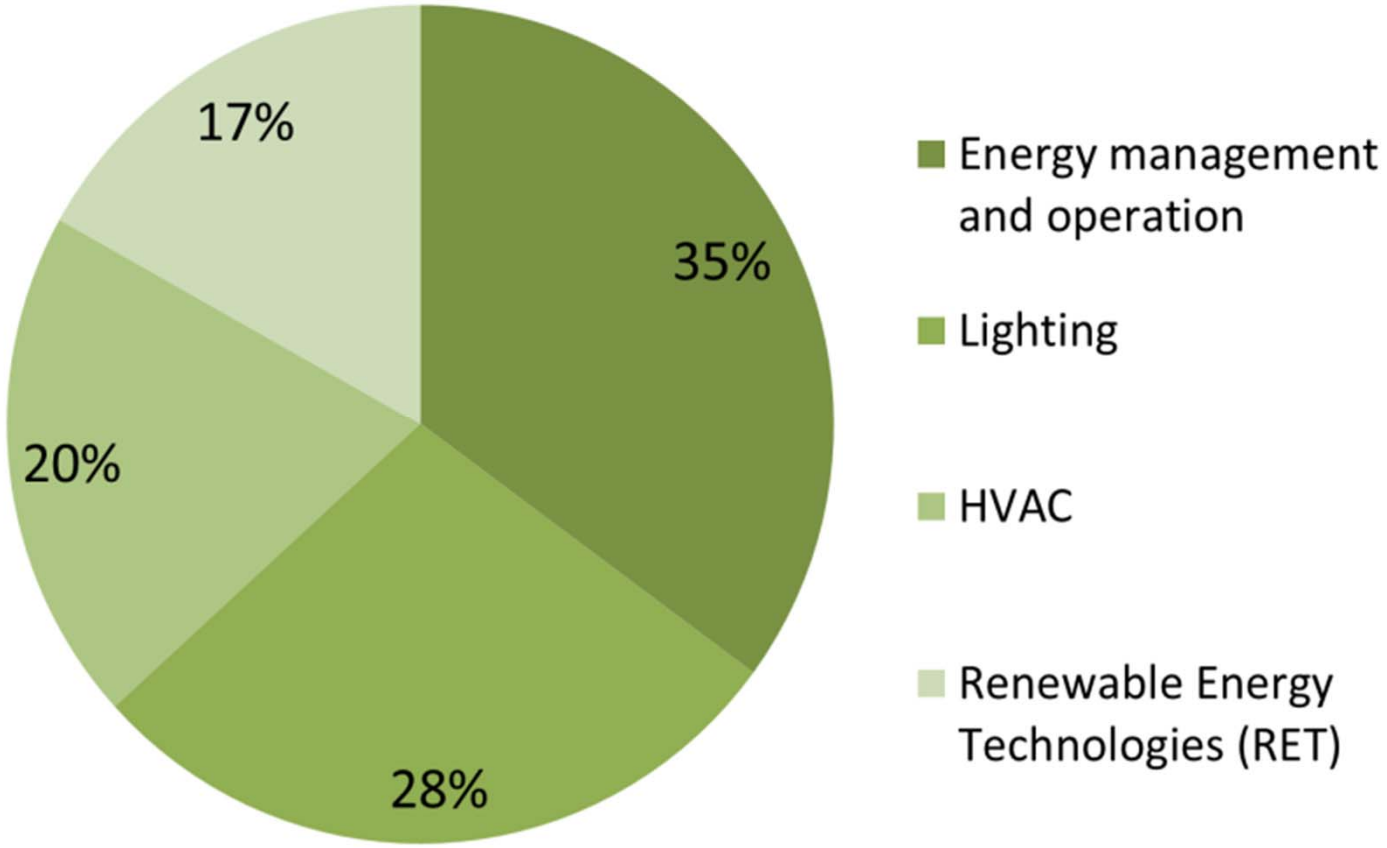


Energy Figures 3 Normalised Figures



ENERGY ACTIONS and INTERESTS

Percentage from total number of Actions



Energy Actions and Interests. 1

Energy Management and Operational Procedures

- Expansion of systems for central operations monitoring of boiler and power controls;
- Environmental training;
- Installation of **additional metering** for controlling major consumption points
- Integration of additional metering with existing Building Management Systems
- Replacing all oil vehicles with **electric Powered vehicles**
- Lower aircraft average taxiing time by 10% by 2015
- Power sources provided at Gate (400Hz) as opposed to using Aircraft APU
- **Shutdown** of Baggage handling systems when not in use

Energy Actions and Interests. 2

Lighting

- **Motion detection** for lighting
- **LED Replacements**
- Intelligent Lighting controls for areas of low occupancy. **Passive Infrared Sensors (PIR)**
- Retrofit of 65000 light fittings with Retrolux system (reduction of approx 20W per fitting)
- Roof glazing replacements

Renewable Energy

- Photovoltaic panels
- Biomass fuel production
- Geothermal
- Wind power

Energy Actions and Interests. 3

Project Pilots

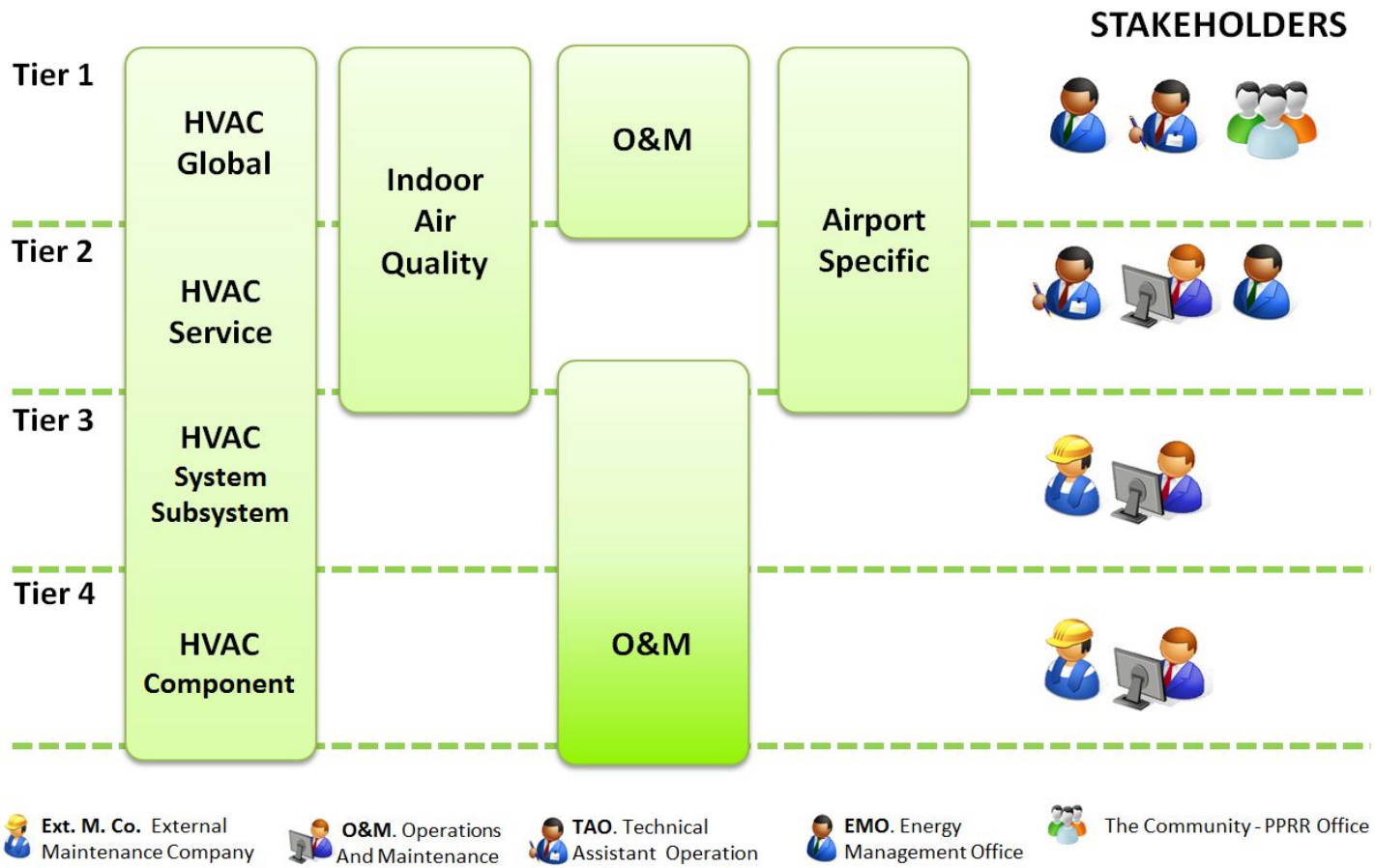
No detailed energy use data monitoring:

- Thermal side are only at the overall airport level (utility bills) >>> identification of subareas
- MXP a daily energy consumption monitoring review is carried out to compare available electrical energy consumption with the consumption **of the day before of the same day in the previous year.**
- At FCO this is done only on **monthly basis.**
- **Need of KPIs for benchmarking**

2010	GIORNO			mercoledì 06-ott-10		
	TOTALE SEA1 + SEA2	Wh		310.538,40 kWh		
	DIFF. GIORNO PRECEDENT		-2,32%	-8.620,71 kWh		-2,70%
	MEDIA GIORNALIERA	Wh		12.939,10 kWh		
DIFFERENZA TRA ANNI				0,98%		
2011	GIORNO			giovedì 06-ott-11		
	TOTALE SEA1 + SEA2	Wh		313.577,88 kWh		
	DIFF. GIORNO PRECEDENT		-0,15%	6.702,62 kWh		2,18%
	MEDIA GIORNALIERA	Wh		13.065,74 kWh		
			Diff. %	kWh	Diff. kWh	Diff. %
TERMINAL 1	Aerostazione	Cabina 16	2,42%	14.443	303	2,14%
		Cabina 17	0,35%	25.119	1036	4,30%
		Cabina 18	-0,90%	37.618	61	0,16%
	BHS	Cabina BHS-N	-3,34%	8.635	304	3,65%
		Cabina BHS-S	-1,23%	9.967	117	1,19%
	Sat. A	Cabina 15	-2,24%	25.372	274	1,09%
	Sat. B	Cabina 14	-1,12%	23.225	1243	5,66%

Future Work

Linking Energy Figures >>> KPIs >>> Stakeholders >>> Energy Management System



Future Work

Linking Energy Figures >>> Airport Related DATA

- Airport size: (area and volume condit. Spaces / area of externally exposed building envelope)
- Shape factors:
  - Compact (One main Building with bus transportation)
  - Pier finger terminals
  - Pier satellite terminals
  - Remote satellite terminals
- Location-Climate : (Hot and cold degree days / HDD and CDD, solar radiation, humidity levels)
- Hours of Operation
- Building envelope (U-Value)
- HVAC Systems and Controls
- Level of maintenance at the facility
- Occupant / User behaviour and energy management

Thank you

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